

## 2.3

### Understanding the relationship between zeros and factors of polynomials

#### End Behaviors

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

**For the given polynomials determine which of the binomials listed are factors. State what method was used (factoring or remainder theorem). Show work!**

1.  $f(x) = 2x^2 - 8x + 6$

a.  $x + 1$

b.  $x - 1$

c.  $x - 3$

2.  $f(x) = x^2 + 9x$

a.  $x - 3$

b.  $x - 0$

c.  $x + 9$

3.  $f(x) = x^3 - x^2 - 5x - 3$

a.  $x + 1$

b.  $x - 1$

c.  $x - 3$

4.  $f(x) = x^3 - 3x + 2$

a.  $x - 1$

b.  $x + 2$

c.  $x + 1$

**Without graphing, determine the number of zeros for each of the following polynomials.**

5.  $f(x) = 2x^2 - 8x + 6$

6.  $f(x) = -x^2 + 9x$

7.  $f(x) = x^3 - 3x + 2$

8.  $f(x) = -x^7 + 27$

9.  $f(x) = -x^4 - 8x^3 - 2x^2 + 3x - 5$

10.  $f(x) = -8x + 6$

**Without graphing, state the degree of the polynomial and determine whether it is even or odd, then write the end behavior as a limit.**

11.  $f(x) = 2x^2 - 8x + 6$

degree:

even or odd:

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

12.  $f(x) = x^5 + 3x^4 - 2x^3 - 5x^2 - 10x + 1$

degree:

even or odd:

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

13.  $f(x) = -x^3 - x^2 - 5x - 3$

degree:

even or odd:

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

14.  $f(x) = -x^4 + 3x - 10$

degree:

even or odd:

$$\lim_{x \rightarrow \infty} f(x) =$$

$$\lim_{x \rightarrow -\infty} f(x) =$$

### Practice Problems

**Factor the following polynomials. Use polynomial identities if necessary. Show work!**

15.  $x^3 + 13x^2 + 42x$

16.  $6az^2 - 2ac + 9bz^2 - 3bc$

17.  $64x^2 - 1$

18.  $m^2 - 24m + 144$

**Simplify each expression using the proper operations. Show work!**

19.  $(3x - 5)(x + 2)$

20.  $2(x - 5) - 3(x^2 + 5x - 1)$